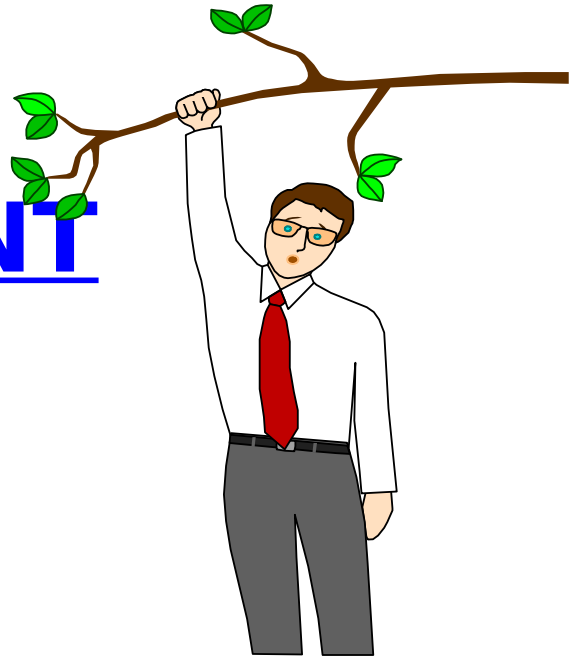
EPMC
RISK MANAGEMENT
Theory & Practice



Monday 1 Nov 2004

TOPICS

- Risk Mgmt Tools & Web Sites
- Risk Study Findings
- Acquisition Risk Policy
- PM Issues & Tasks
- Risk Mgmt Process

Peter F Drucker…

ll matters of true uncertainty such as the executive deals with – wheth
r her) sphere be political, economic, social, or military – one needs crea
solutions which create a new situation. And this means that one needs
magination – a new and different way to perceiving and understanding

WEB-BASED RISK MANAGEMENT

"TOOLS & WEBSITES"

- **Risk Management Guide June 2003**
  - www.dau.mil/pubs/gdbks/risk_management.asp

- **Risk Management Community of Practice**
  (PMCoP) – Part of Acquisition Community Connection (ACC)
  - http://acc.dau.mil

- **Textbook – "Managing Risk in Organizations" by J.Davidson Frame; published by Jossey-Bass, 2003**

- **Risk Management Learning Module**
  - http://clc.dau.mil/kc/no_login/portal.asp

RISK STUDY FINDINGS

Risk Management concepts:

- **Strong on "knowledge"**
- **Generally weak on application**

Knowledge & Application of Risk Managemen

- **Information Systems especially weak**

Risk Management Training needs to emphasi more application

- **Practical exercises**
- **Integration with other tools available to PM**

DoDD 5000.1 – Risk Management Emphasis

Enclosure 1 (Para E1.6) Cost Sharing. The PM shall structure the acquisition in a way that neither imposes undue risk on contractors, nor requires unusual contractor investment.

Enclosure 1 (Para E1.14) Knowledge-Based Acquisition. PMs shall provide knowledge about key aspects of a system at key points in the acquisition process. PMs shall reduce technology risk, demonstrate technologies in a relevant environment, and identify technology alternatives, prior to program initiation. They shall reduce *integration* risk and demonstrate product design prior to the design readiness review. They shall reduce manufacturing risk and demonstrate producibility prior to full-rate production.

DoDI 5000.2 Risk Management Emphasis

- **Para 3.3.2.1 Spiral Development. In this process, a desired capability is identified, but the end-state requirements are not known at program initiation. Those requirements are refined through demonstration and risk management.**

- **Para 3.4.2 Technologists and industry shall identify and protect promising technologies in laboratories and research centers, academia, and foreign and domestic commercial sources; reduce the risks of introducing these technologies into the acquisition process; and promote coordination, cooperation, and mutual understanding of technology issues.**

- **Para 3.7.2.2 The management and mitigation of technology risk, which allows less costly and less time-consuming systems development, is a crucial part of overall program management and is especially relevant to meeting cost and schedule goals. Objective assessment of technology maturity and risk shall be a routine aspect of DoD acquisition. Technology developed in S&T or procured from industry or other sources shall have been demonstrated in a relevant environment or, preferably, in an operational environment to be considered mature enough to use for product development in systems integration. Technology readiness assessments, and where necessary, independent assessments, shall be conducted. If technology is not mature, the DoD Component shall use alternative technology that is**

Acquisition Risk Management Emphasis

(Defense Acquisition Guidebook)

Para 2.3.5 Risk Management. The program manager should establish a risk management process consistent with section (para) 4.2.3.5., and summarize the process in the Acquisition Strategy. Effective risk management depends on the knowledge gleaned from all aspects of the program. *Knowledge reduces risk*. Risk management is a principal factor in the renewed and increased emphasis on *demonstration* evident in DoD Instruction 5000.2.

Para 4.2.3.5 The program manager establishes a risk management process, including planning, assessment (identification and analysis), handling, and monitoring, to be integrated and continuously applied throughout the program, including, but not limited to, the design process.

Para 11.4 The program manager and others in the acquisition process should take an active role in identifying and understanding program uncertainties, whether they have a negative or positive impact on the program baseline. An assessment of cost, schedule, or performance against a program baseline is not credible or realistic if uncertainties are not recognized and in some manner incorporated into estimates and assessments in a transparent manner.

Para 10.5.2 Technology maturity is a measure of the degree to which proposed critical technologies meet program objectives; and, is a principal element of program risk. A technology readiness

PMs' Risk Management Issues

- **Establishment and maintenance of Govt/Ktr risk mgmt process**
  - **Contract structure that supports risk mgmt**
  - **Robust Ktr risk mgmt system/process/plan**

- **Entire team (Top Staffs, PMO, IPTs, Ktr) "singing same tune" regarding risk**

- **Leadership's understanding of delayed ROI for risk mgmt activities; rewards for good risk mgmt**

- **Simplification of risk mgmt process and tools**

PMs' Risk Management Tasks

Specifying Contractual Risk Mgmt Requirements
- Starts with Sections L & M of RFP

Creating Risk Management Plan (Process)

Identifying and implementing/executing best practic
and lessons learned (i.e. Handling Plan) to deal wit
risk events

Access Cyber "Risk Mgmt Grey Beards" where
PMs can go for assistance/advice

Access risk mgmt templates and tools for teams
to modify or tailor process to their needs

Risk Management

Two Components – Opportunities & Risk Even

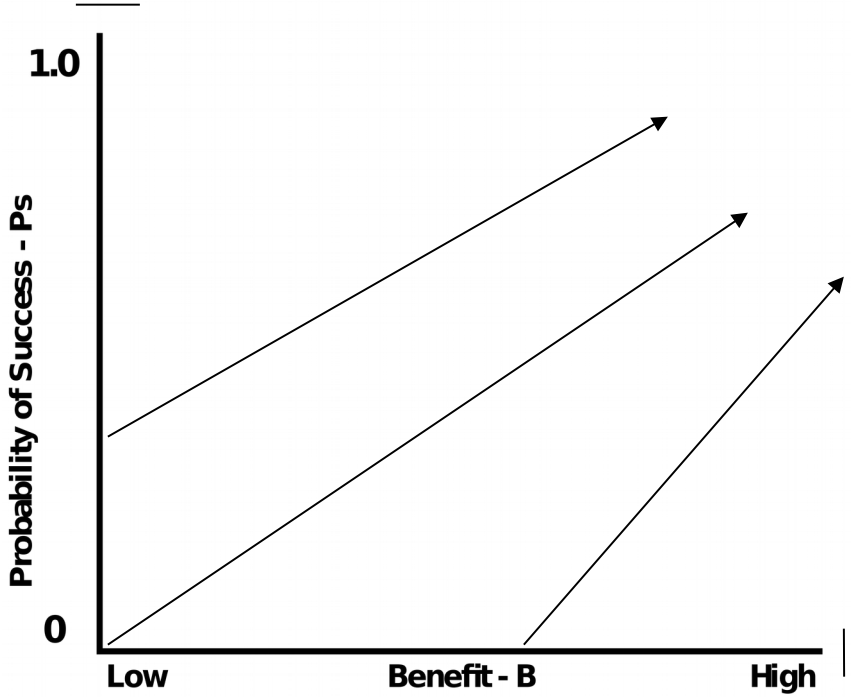
Both have probabilities and outcomes

Executive Level = balanced view, big picture

“Worker Bees” main tasks = identifying and handling risk events

Managing Risk

"Opportunities are Good!"



Opportunity:

1. **A favorable or advantageous combination or circumstances; suitable occasion or time.**
2. **A chance for progression and advancement.**

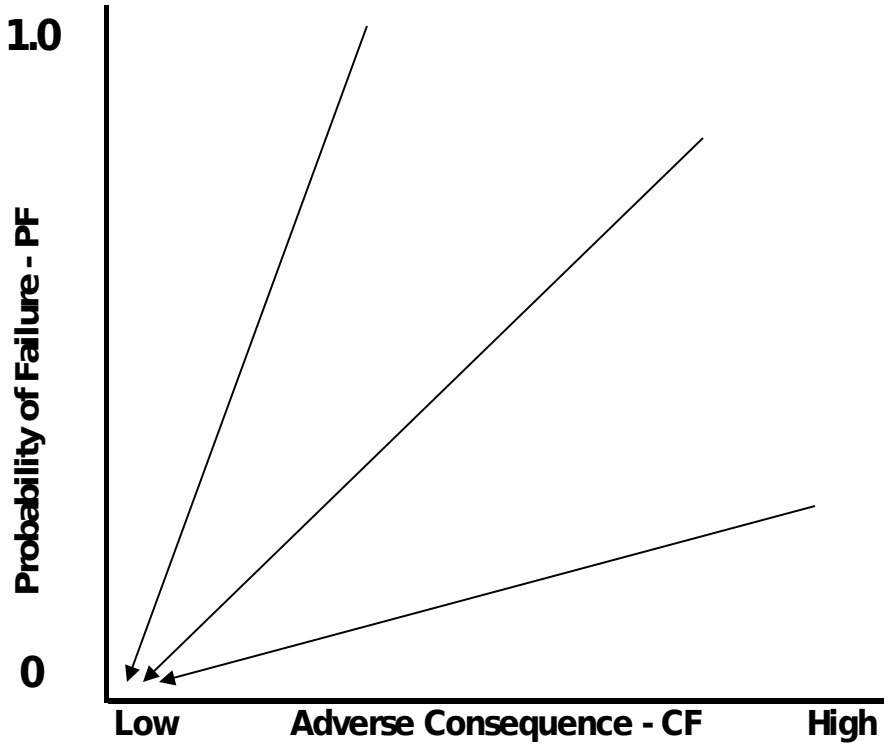
Considerations:

1. **Is the opportunity beneficial?**
2. **Is the opportunity doable?**
3. **Is the benefit worth the cost and risk?**

Manage so as to enhance the high benefit and high probability!

Managing Risk

"Risks are bad!"



Risk:

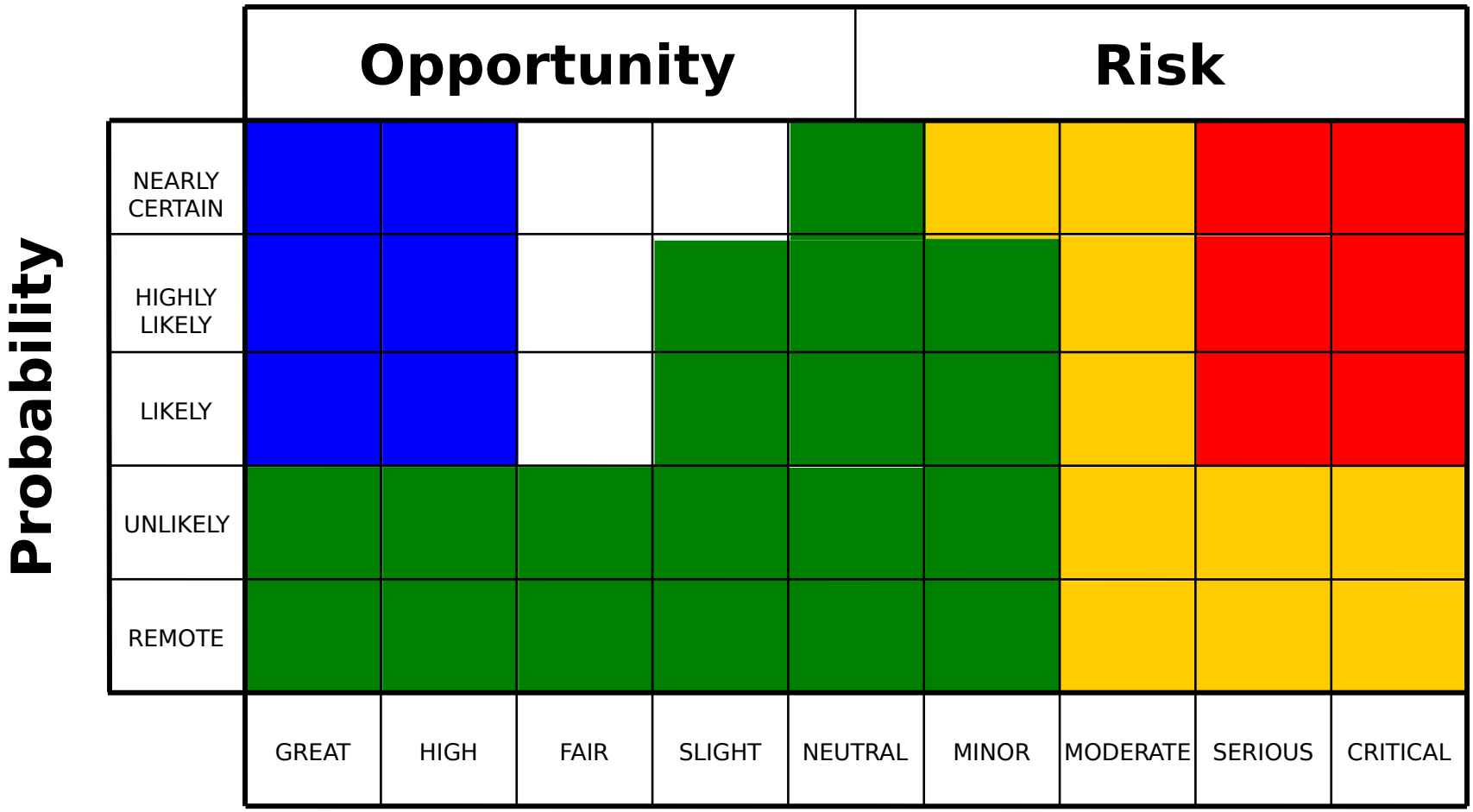
1. The possibility of suffering harm or loss.
   (potential problem)
2. A factor, element, or course involving uncertain danger.

Considerations:

1. What can be done to eliminate or reduce the risk?
2. What other areas can potentially be affected by the risk?
3. Is the risk worth the benefit?

Manage so as to move probability and consequence (impact) toward zero!

OPPORTUNITIES & RISKS



& Blue ratings justify major investment of resources & effort
w & White ratings justify secondary consideration
een ratings are low priority (track but leave alone)
Probability = odds of achieving opportunity or risk occurring

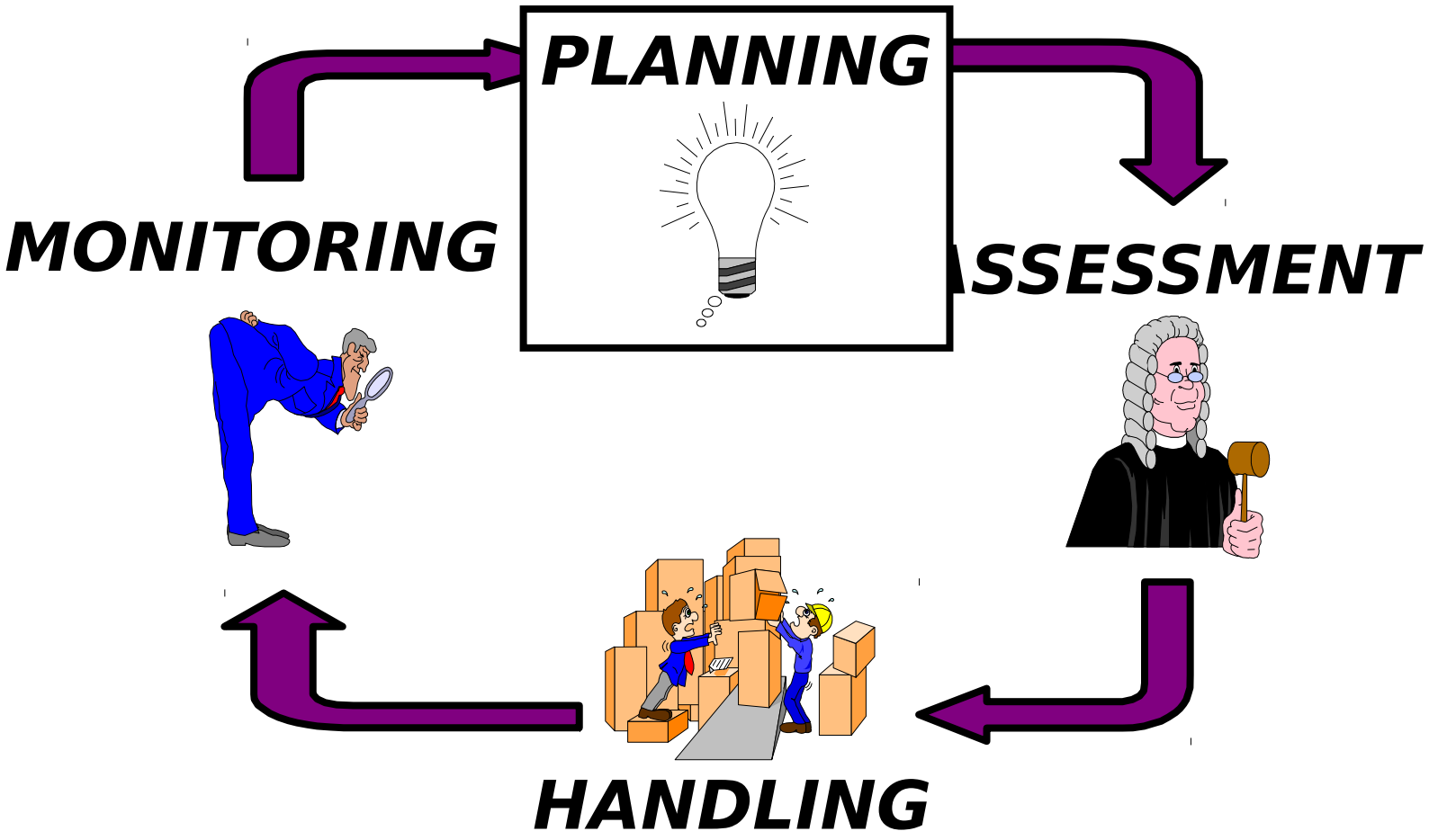
ACQUISITION RISK -- DEFINITION

- **A Measure of Potential Inability to Achieve Defined Program Cost / Schedule / Performance GOALS**

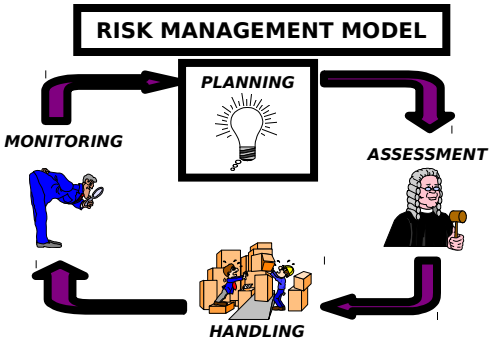
- **Each Risk (Risk Event) Has 2 Components:**
  PROBABILITY -- Event Will Occur
  CONSEQUENCES -- Adverse Impact to Program

WALKING THE PLANK!

RISK MANAGEMENT MODEL*



*** DoD/DAU Risk Guidebook**



RISK PLANNING

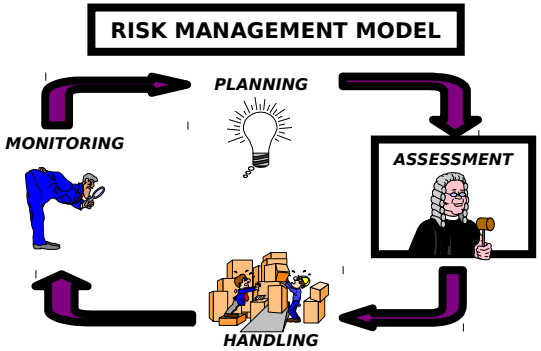
- **Develop an Organized, Comprehensive, & Iterative Approach for an Effective Acquisition Risk Management Program**
- **Train IPT Members in Risk Management Processes**
- **Assign Responsibilities to Team Members**
- **Create a Risk Coordinator**
- **Develop Management Information System (MIS)**
- **Draft Risk Management Plan (Documentation)**

RISK MANAGEMENT IN INTEGRATED PRODUCT & PROCESS (IPPD) ENVIRONMENT

- Empowerment -

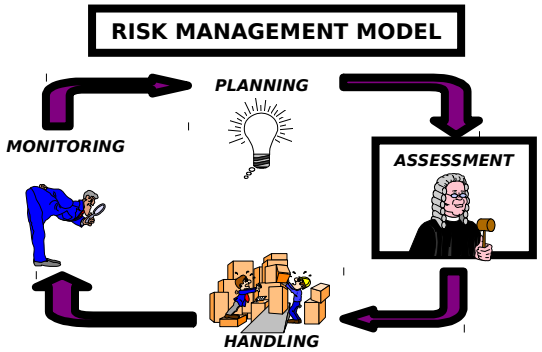
" Decision making should be driven to the lowest possible level commensurate with ***risk***. Resources should be allocated to levels consistent with ***risk*** assessment authority, responsibility & ability of people.

- The team should be given the authority, responsibility, & resources to manage its product & its ***risk*** commensurate with the team's capabilities.
- The authority of team members needs to be defined & understood by the individual team members.
- The team should accept responsibility & be held accountable for the results of its efforts."



RISK ASSESSMENT

- **Identification** of Risk Events
- **Analysis** of Probability & Consequence
- **Priority** of Risk Events for Handling

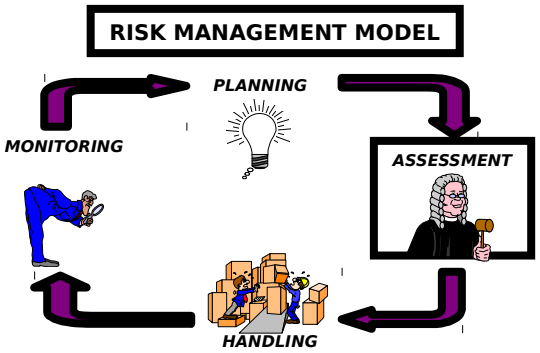


RISK ASSESSMENT

(Sub-process: Identification)

- **What Are the Risk Events in the Program?**
  - **Known / Knowns**
  - **Known / Unknowns**
  - **Unknown / Unknowns**
- **Where Are Risk Events Located in the Program?**
  - **Requirements, Technology, Design, T&E, M&S, Cost,**

    Schedule, etc.
- **Examine Sources/Areas of Risk to Determine Risk Events**

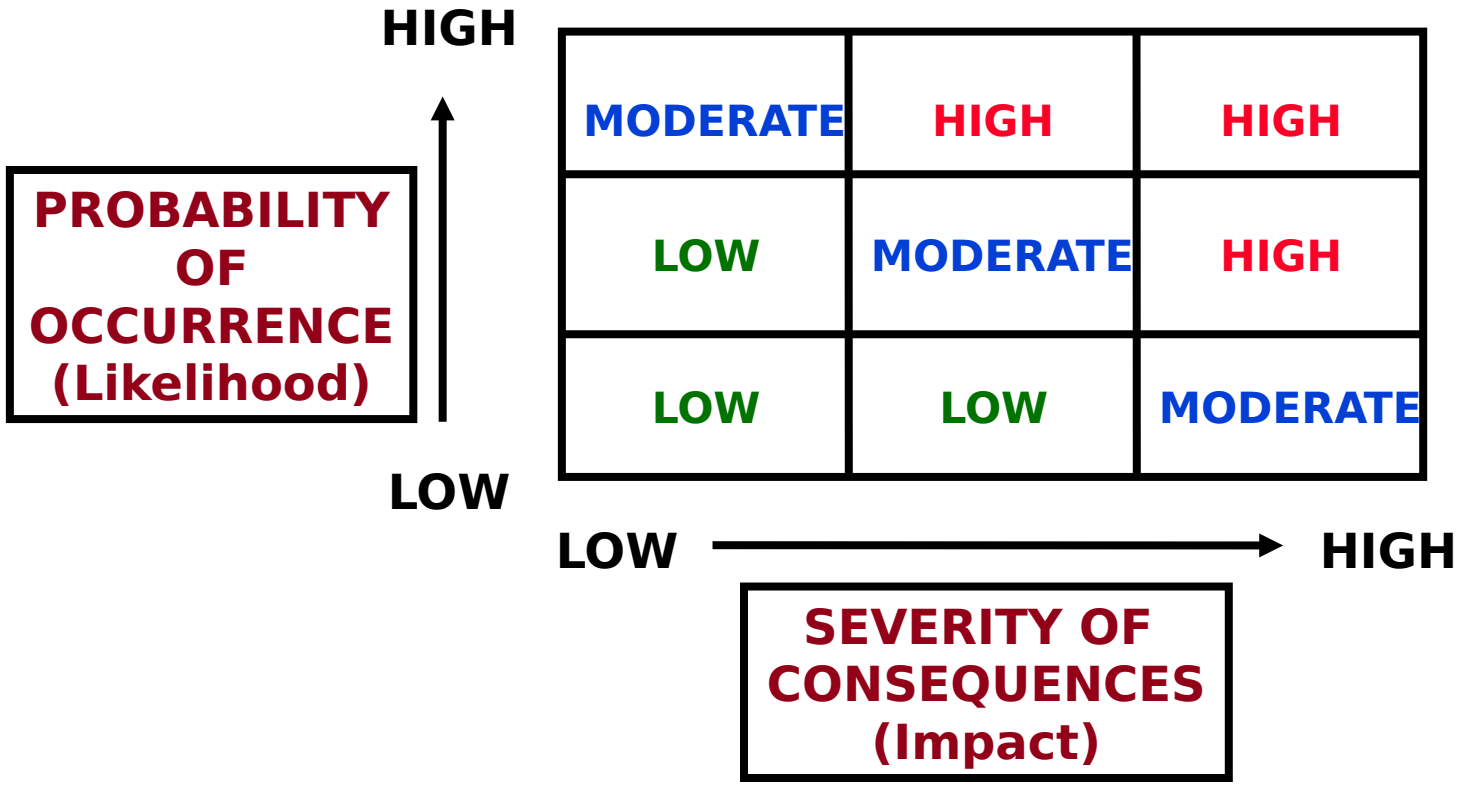


RISK ASSESSMENT

(Sub-process: Analysis)

- Description of Risk Event (What Could Go Wrong?)
- Isolate the Cause of Risk Event
- Determine the Probability & Impact of Risk Event
- Use Prob & Impact to determine High, Medium, & Low Risk Ratings?
  - Apply Generic Risk Assessment Matrix to Rate/Prioritize Risk Events
  - Tailor Prob, Impact metrics/axes to the Product or Process
  - Measure Risk Impact on Cost, Schedule,

GENERIC RISK ASSESSMENT MATRIX

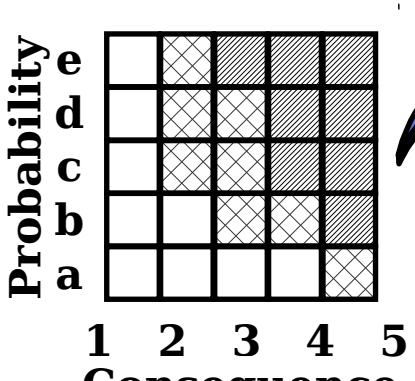


RISK ASSESSMENT

Questions about Risk Management?

Call a Member of the Process Integration Team for Risk.

ASSESSMENT GUIDE



***Probability*:**

Level	What Is The Probability The Risk Will Happen?
a	Remote
b	Unlikely
c	Likely
d	Highly Likely
e	Near Certainty

***Consequence*:**

Given The Risk is Realized, What is the Magnitude of the Impact?

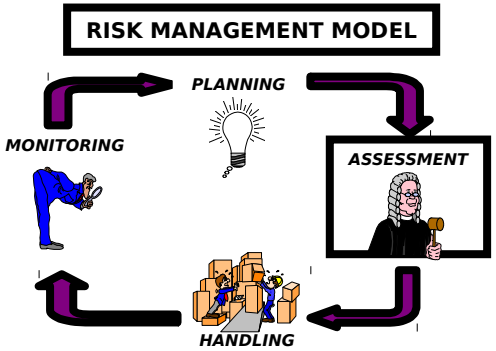
Level	Technical and/or Performance	Cost and/or Schedule	Impact on Other Teams
1	Minimal or No Impact	Minimal or No Impact	None
2	Acceptable with Some Reduction in Margin	< 5% Additional Resources Required; Some Impact to Dates	Able to Meet Need
3	Acceptable with Significant Reduction in Margin	5 - 7% Moderate Impact	Minor Slip in Key Milestone; Not Able to Meet Need Dates
4	Acceptable, No Remaining Margin	> 7 - 10% Major Impact	Major Slip in Key Milestone or Critical Path Impacted
5	Unacceptable	> 10%	Can't Achieve Key Team or

RISK ASSESSMENT

HIGH - Unacceptable. Major disruption likely. Different approach required. Priority management attention required.

MODERATE - Some disruption. Different approach may be required. Additional management attention may be needed.

LOW - Minimum impact. Minimum oversight needed to ensure risk remains low.

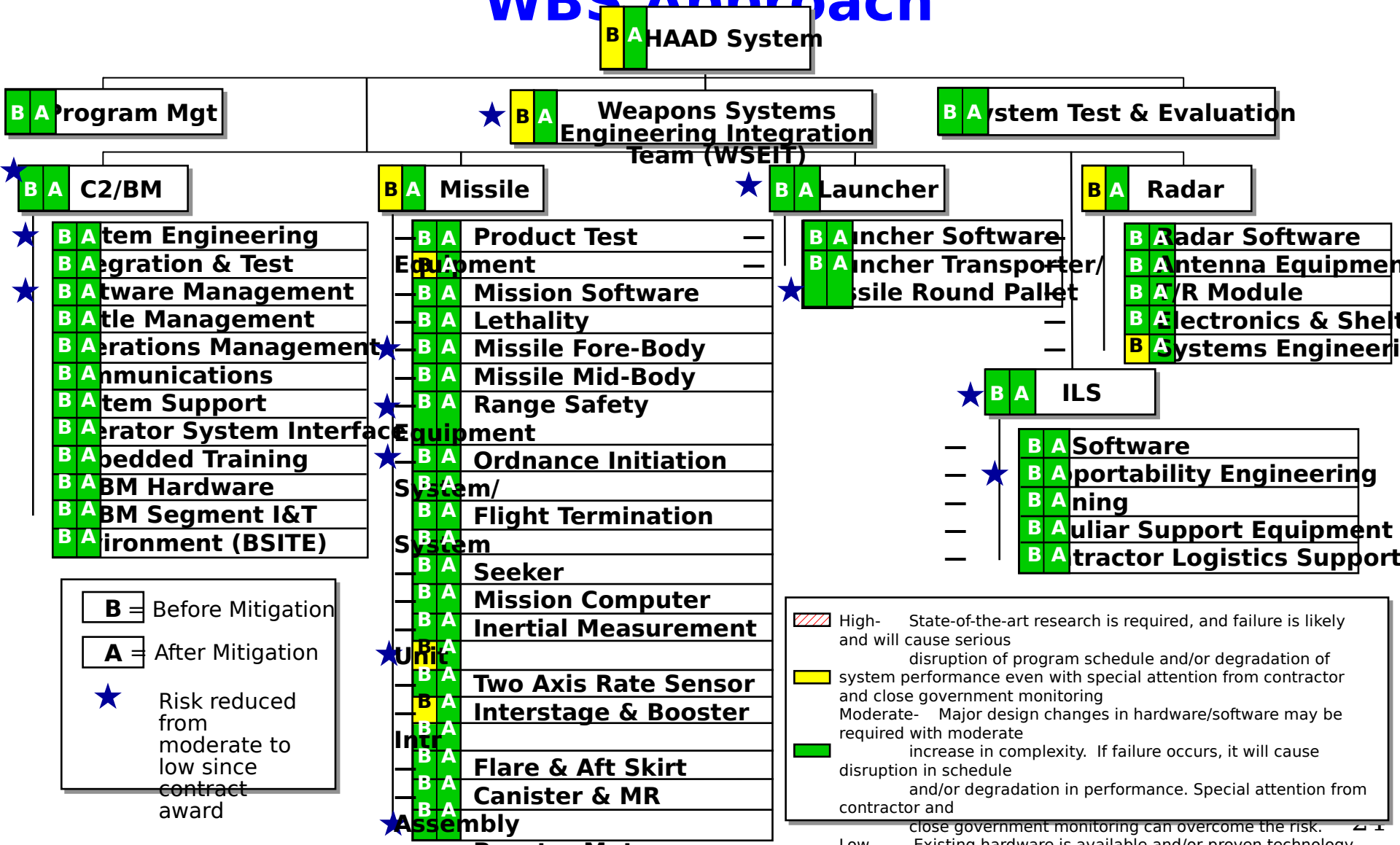


RISK ASSESSMENT
(ASSESSMENT APPROACHES)

- Requirements Approach
- WBS Approach (Product & Process):
  - E.G., THAAD
- Functional Process Approach: “Willoughby Templates”
- Commercial Methods:
  - Carrier Air Conditioning (Prob & Consequence)
  - Cessna Aircraft (More into Problem Solving than Risk Mgmt)
- Staffing Model:
  - Defense Contract Management Agency
    - http://home.dcma.mil/cbt/ramp/overview.htm

THAAD Program Risk Assessment (U)

"WBS Approach"


B A THAAD System
B A Program Mgt
B A Weapons Systems Engineering Integration Team (WSEIT)
B A System Test & Evaluation
B A C2/BM
B A Missile
B A Launcher
B A Radar
B A tem Engineering
B A egration & Test
B A tware Management
B A tle Management
B A erations Management
B A mmunications
B A tem Support
B A erator System Interface
B A bedded Training
B A BM Hardware
B A BM Segment I&T
B A ironment (BSITE)
B A Product Test
Equipment
B A Mission Software
B A Lethality
B A Missile Fore-Body
B A Missile Mid-Body
B A Range Safety Equipment
B A Ordnance Initiation
System/
B A Flight Termination
System
B A Seeker
B A Mission Computer
B A Inertial Measurement Unit
B A Two Axis Rate Sensor
B A Interstage & Booster Intr
B A Flare & Aft Skirt
B A Canister & MR Assembly
Booster Motor
B A uncher Software
B A uncher Transporter/ ssile Round Pallet
B A Radar Software
B A Antenna Equipmen
B A T/R Module
B A Electronics & Shelt
B A Systems Engineeri
B A ILS
B A Software
B A portability Engineering
B A ning
B A uliar Support Equipment
B A tractor Logistics Support
B = Before Mitigation
A = After Mitigation
Risk reduced from moderate to low since contract award
High- State-of-the-art research is required, and failure is likely and will cause serious disruption of program schedule and/or degradation of system performance even with special attention from contractor and close government monitoring
Moderate- Major design changes in hardware/software may be required with moderate increase in complexity. If failure occurs, it will cause disruption in schedule and/or degradation in performance. Special attention from contractor and close government monitoring can overcome the risk.
Low- Existing hardware is available and/or proven technology application can overcome risk. Failure is unlikely to cause

Risk Assessment - Process Approach

"Willoughby Templates"

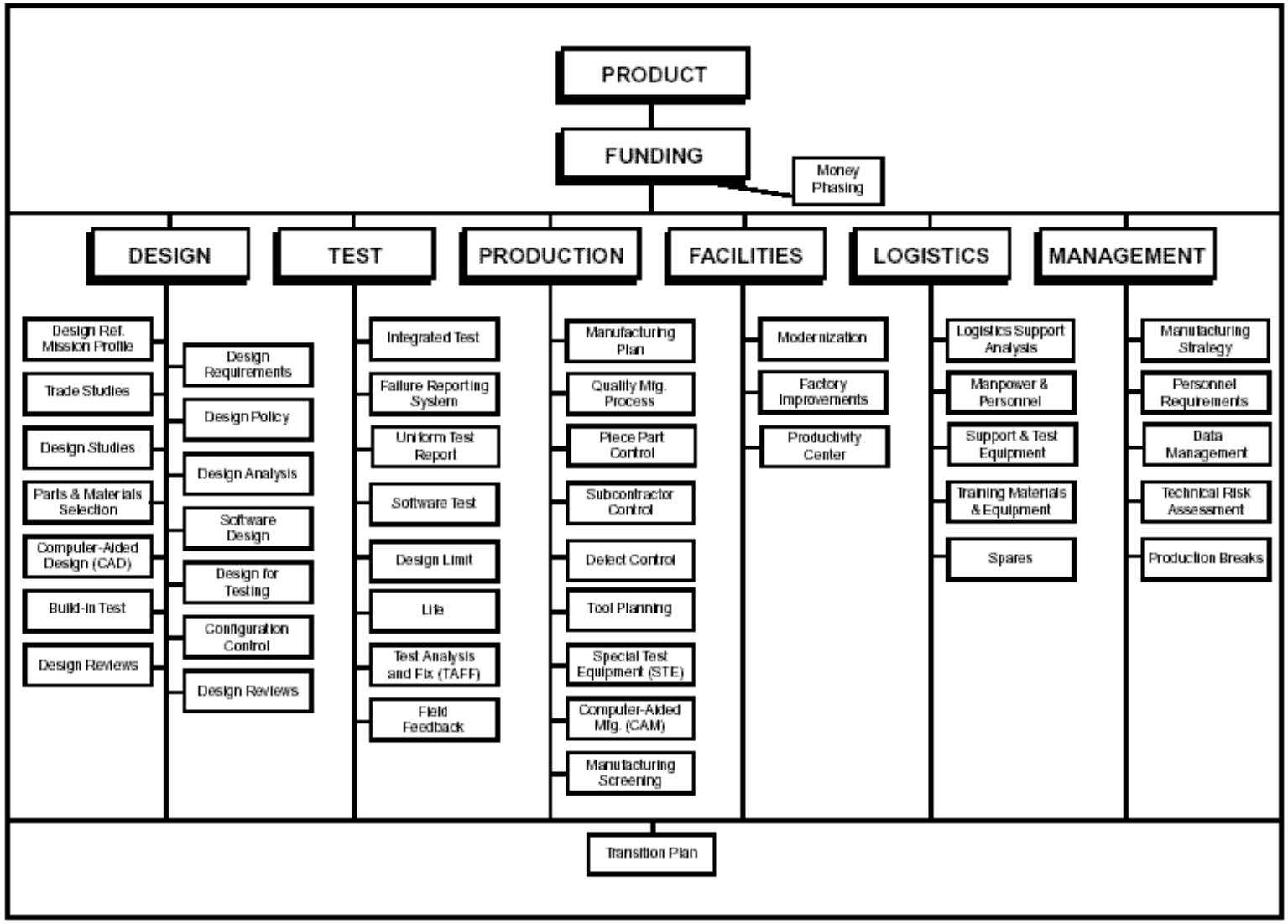
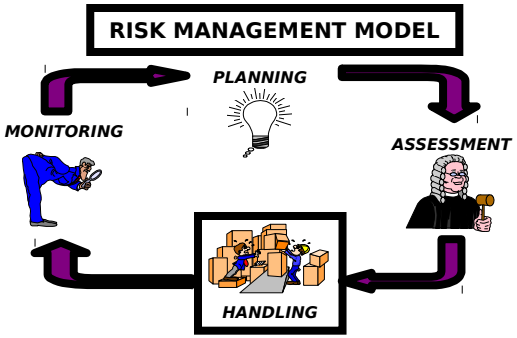


Figure 2-2. Critical Process Areas and Templates

Functional Process Approach

"Willoughby Templates"

Go to
Technical Risk Identification Model (TRIMS)
For Demo



RISK HANDLING

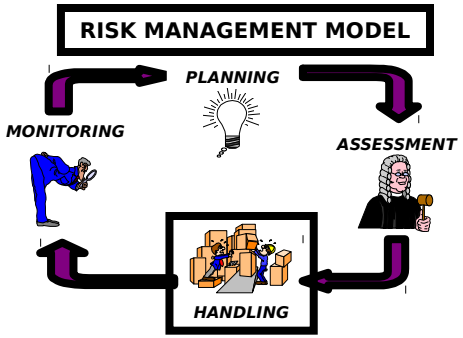
CAAT

CONTROL: Reduce Probability &/or Impact (P³I, Reuse S/W, Parallel Design, In-Process Reviews)

AVOID: Use Another Path
(Redesign, Eliminate Req, Change IOC, COTS)

ASSUME: Make No Changes
(Mgmt/Risk Reserve = $ & Sch)

TRANSFER: Reduce Impact
(Warranties, FP Contracts, Insurance)



RISK HANDLING METRIC

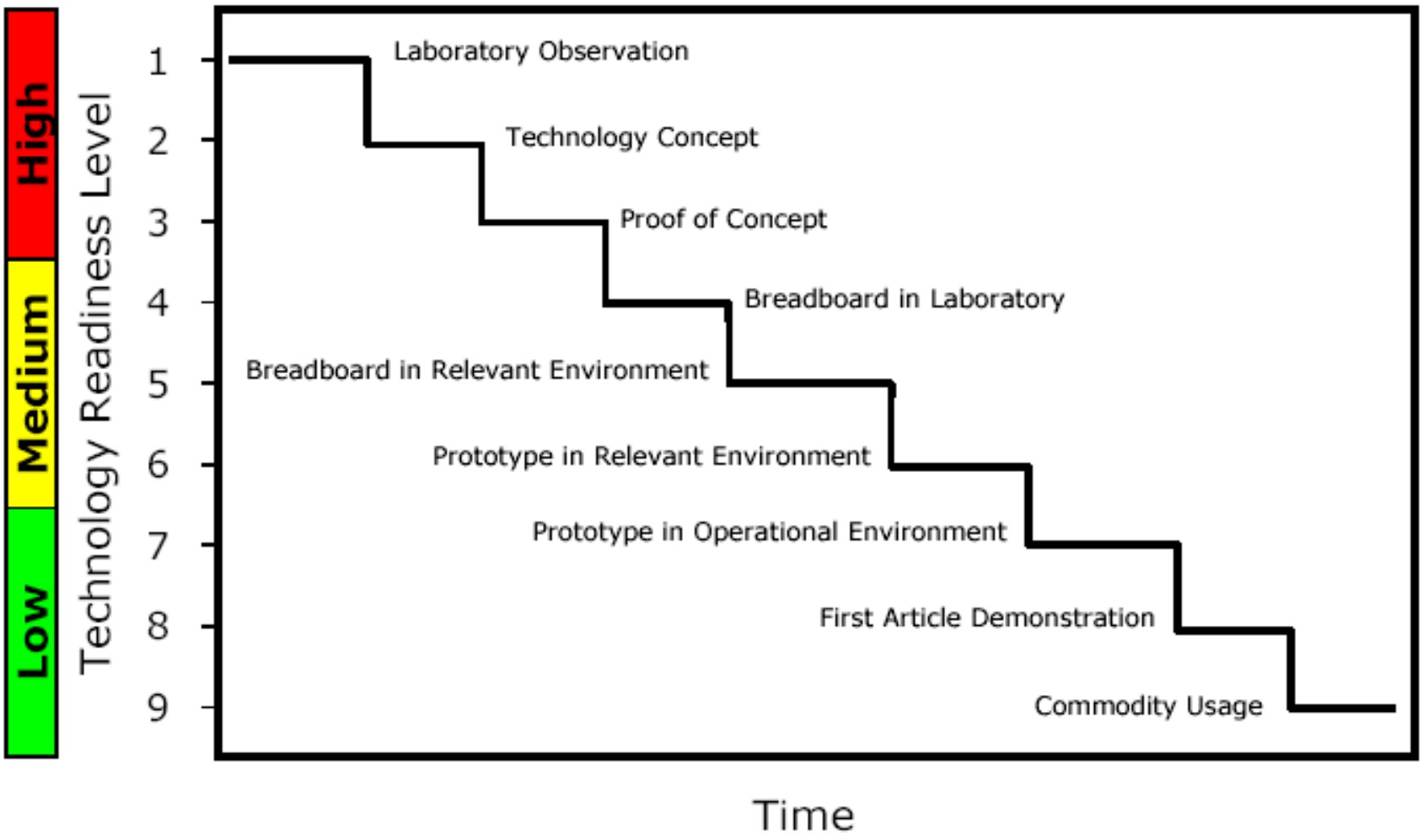
"Exit Criteria"

"Exit criteria will normally be selected to track progress in important technical, schedule, or management *risk* areas."

"At Each Milestone Review, the PM Shall Propose Exit Criteria Appropriate to the Next Phase of the Program. The MDA Shall Approve Exit Criteria… (they) Serve as Gates That, When Successfully Passed or Exited, Demonstrate That the Program is on Track to Achieve its Final Program Goals…"

Demonstrated Performance e.g. Engine Thrust
Some Level of Efficiency e.g. Manufacturing Yield
Some Event e.g. First Flight

RISK "WATERFALL"



Risk Title: DACS DCS Thruster Redesign

LMMS ID No.: 631 **Missile Segment:** Missile

Risk Description:

Divert Control System (DCS) thruster design engineering testing indicated combustion instability. Risk is number of design iterations required to tune acoustical cavities for MON-25 DCS design.

Potential Impact:

Schedule and cost impacts associated with achieving technical requirements.

Risk Areas	Complexity Factor	Program Risk Rating	
Technology		MODERATE	
Design & Eng	7		
Performance	8		
Manufacturing			
Supportability		Overall CF	
Schedule	6	Original	Current
Cost	6	8.0	5.6

Mitigation Planning and Status

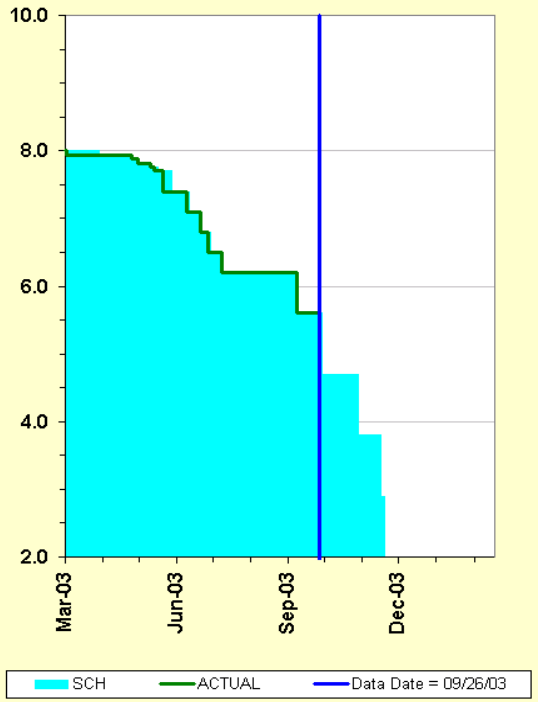
Step		Completion Dates Estimated	Actual	Step %
1	Begin fault tree analysis	03/30/03	03/02/03	1
2	Perform MON-10 to gain insight	04/25/03	04/25/03	1
3	Define cavity modifications	04/30/03	04/30/03	1
4	Modify injectors for retests	05/10/03	05/10/03	1
5	Develop test plan with various cavity sizes	05/17/03	05/13/03	1
6	Perform DCS test with 0.365 cavities	05/29/03	05/21/03	5
7	Perform DCS test with 0.400 cavities	06/12/03	06/09/03	5
8	0.400 Equivalent cavity test results review	06/20/03	06/20/03	5
9	Perform DCS test with 0.280 cavities	06/30/03	06/27/03	5
10	Investigate 0.400 equivalent cavity 27 kHz response	07/08/03	07/08/03	5
11a	Initial Large Open Area Bi/Tri-tuned testing	09/09/03	09/08/03	10
11b	Perform lower MON levels survey	09/30/03		15
11c	ACS look-a-like testing	10/30/03		15
11d	Center Core DCS testing	11/17/03		15
12	Execute backup plan, if required	11/20/03		15

Closure Criteria:

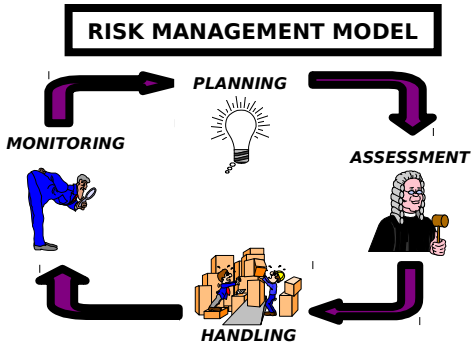
DACS prototype test demonstrates combustion stability

Retirement Justification:

Risk Reduction Schedule



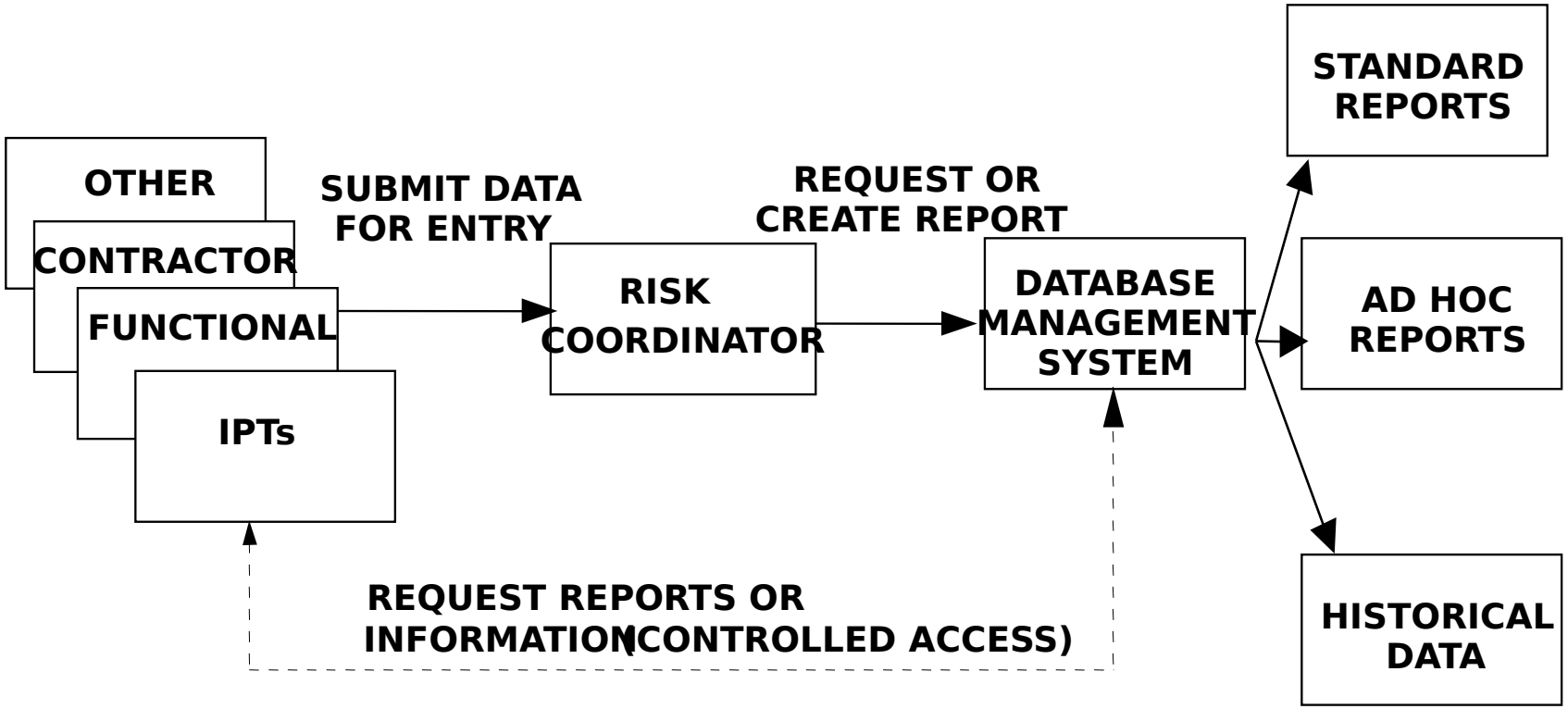
Responsible Risk POC: John Shoults - (408) 743-0949



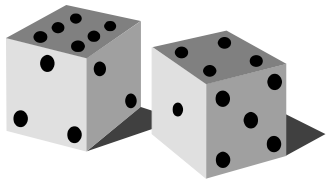
RISK MONITORING

- **Related to Earned Value Measurement & Program Control (Cost, Schedule, & Performance Measurement Reports)**
- **Track & Evaluate Handling/Mitigation of Risk Events**
- **Consolidated Acquisition Reporting System (CARS)**
  - **Acquisition Program Baseline (APB)**
  - **Defense Acquisition Executive Summary (DAES)/Unit Cost Reports (UCR)**
  - **Selected Acquisition Report (SAR)**

CONCEPTUAL RISK MGT REPORTING SYSTEM



RISK MANAGEMENT



SUMMARY

- Essential Part of Program Management
- Includes both Opportunities & Risk Events
- Risk Events: Identified, Assessed, Handled & Monitored
- Risk Events Are Classified As LOW, MODERATE, or HIGH Depending on PROBABILITY of Occurrence and SEVERITY OF CONSEQUENCES
- High & Moderate Risks Handled
- Affordability (CAIV) C, S, P, Risk Trade-Offs

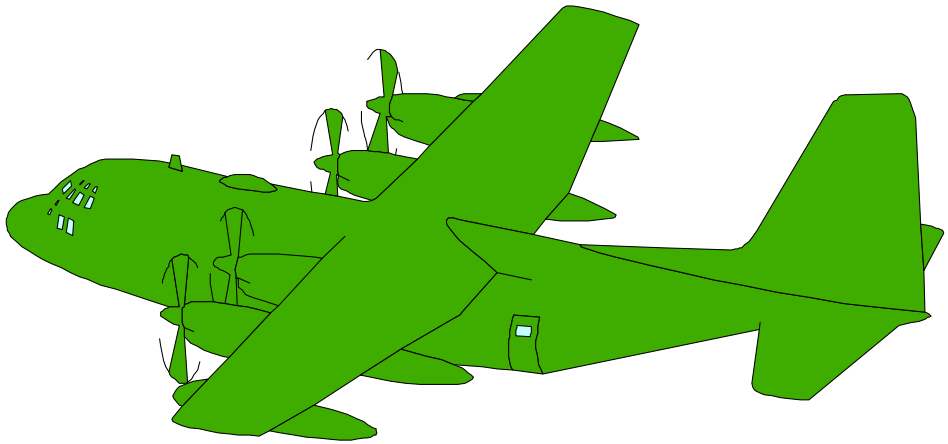
Backup Caselet

se if sufficient time, or distribute for PM applications

Example - Case Study
Risk Assessment

Situation

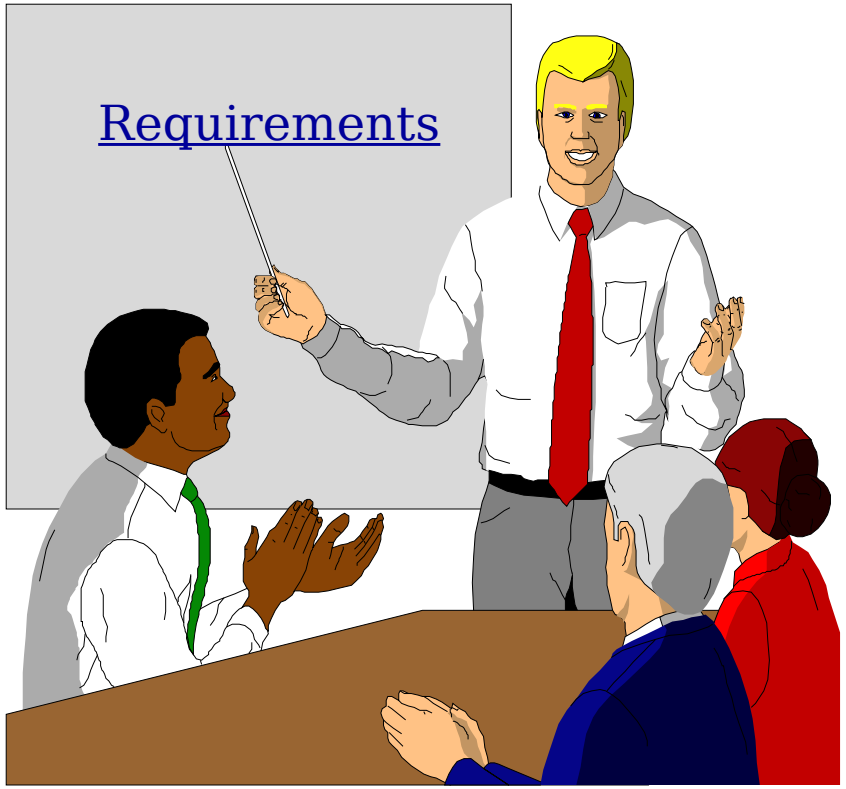
- Cracks found in center wing section of C-130
- Inadequate facilities available on base for repair
- TCTO* mod kits available in 9 months



* Time Constrained Technical Order

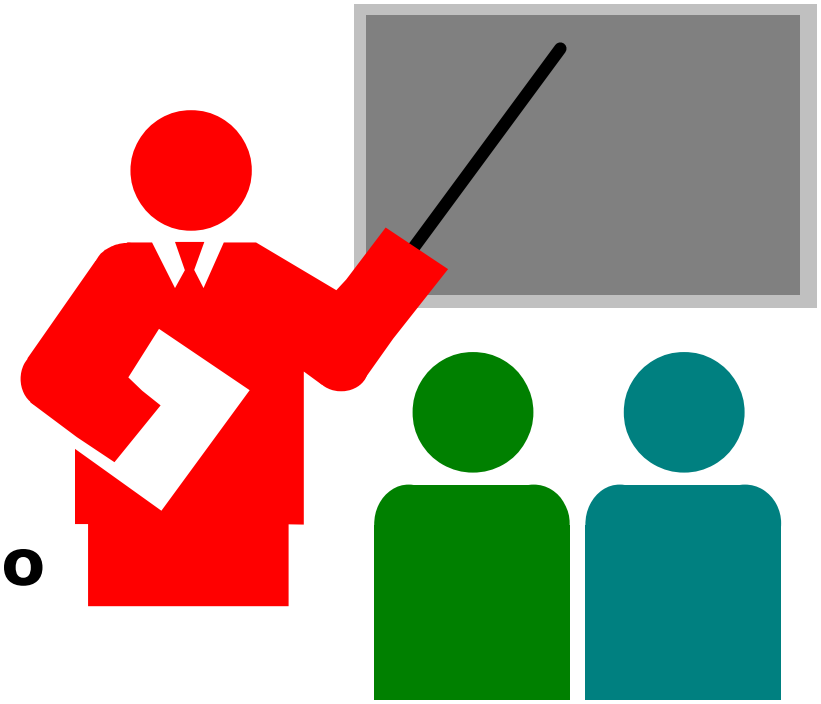
Requirements

- **Facility capable of supporting major wing repair**
- **Capability to modify 2 aircraft every 90 days for 3 years**
- **Tooling & Jigs to repair center wing**
- **Must start TCTO repair within 12 months**



Risk Identification

- **Use brainstorming to identify the risks associated with each requirement**
- **Rank each risk on:**
  - **Probability**
  - **Impact**
- **Probability - Scale 1 to 5**
- **Impact - Negligible to Critical**

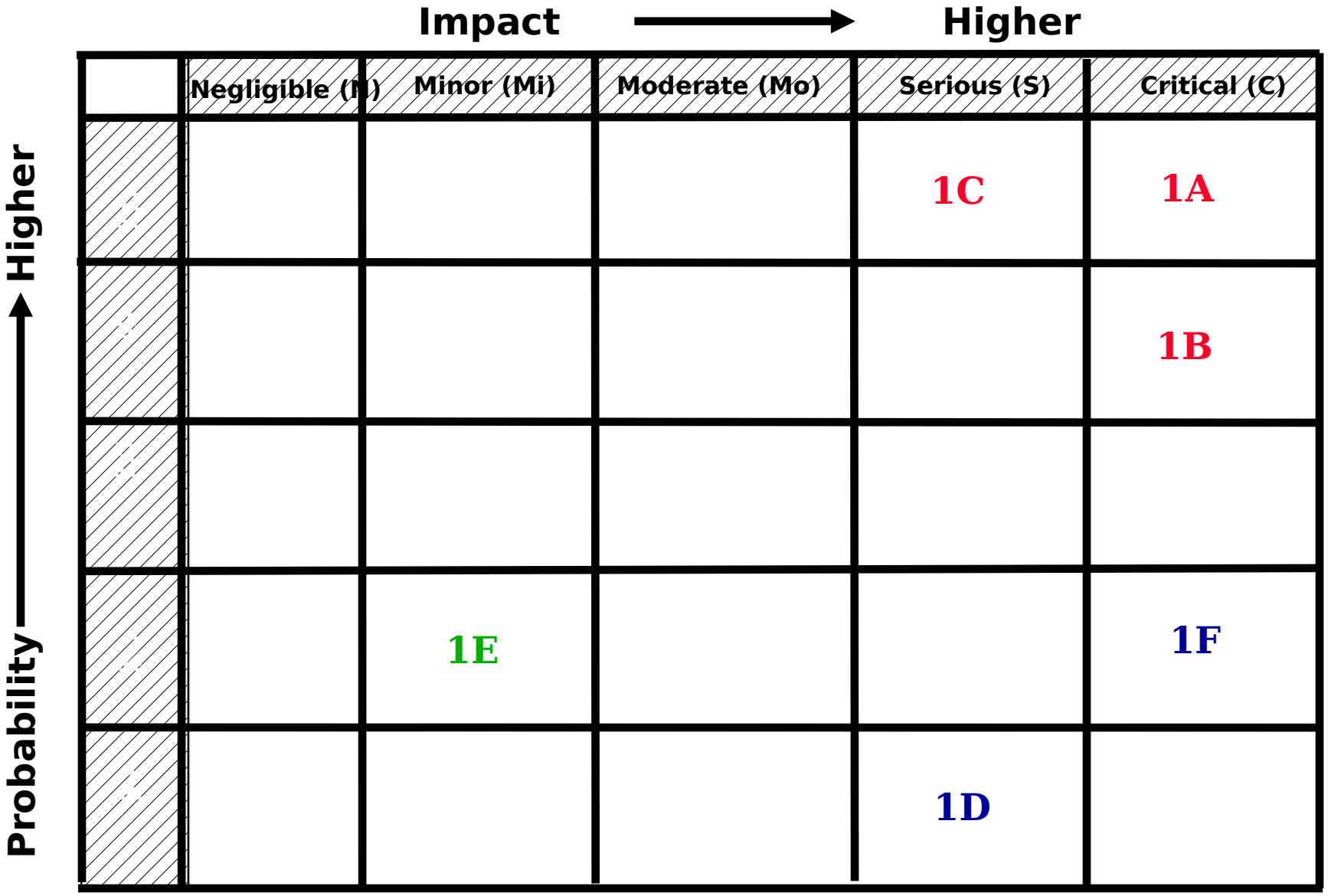


Risk Identification

Req. # 1 Facility capable of supporting major wing repair

		Pr	Im
A	Facility not large enough	5	C
B	Parking ramp not large enough to accommodate aircraft	4	C
C	Contractor equipment not furnished	5	S
D	No environmental licenses	1	S
E	No secure area for storage of Government property	2	Mi
F	No ability to defuel aircraft and purge tanks	2	C
G			
H			
I			
J			

Risk Matrix Scatter Diagram

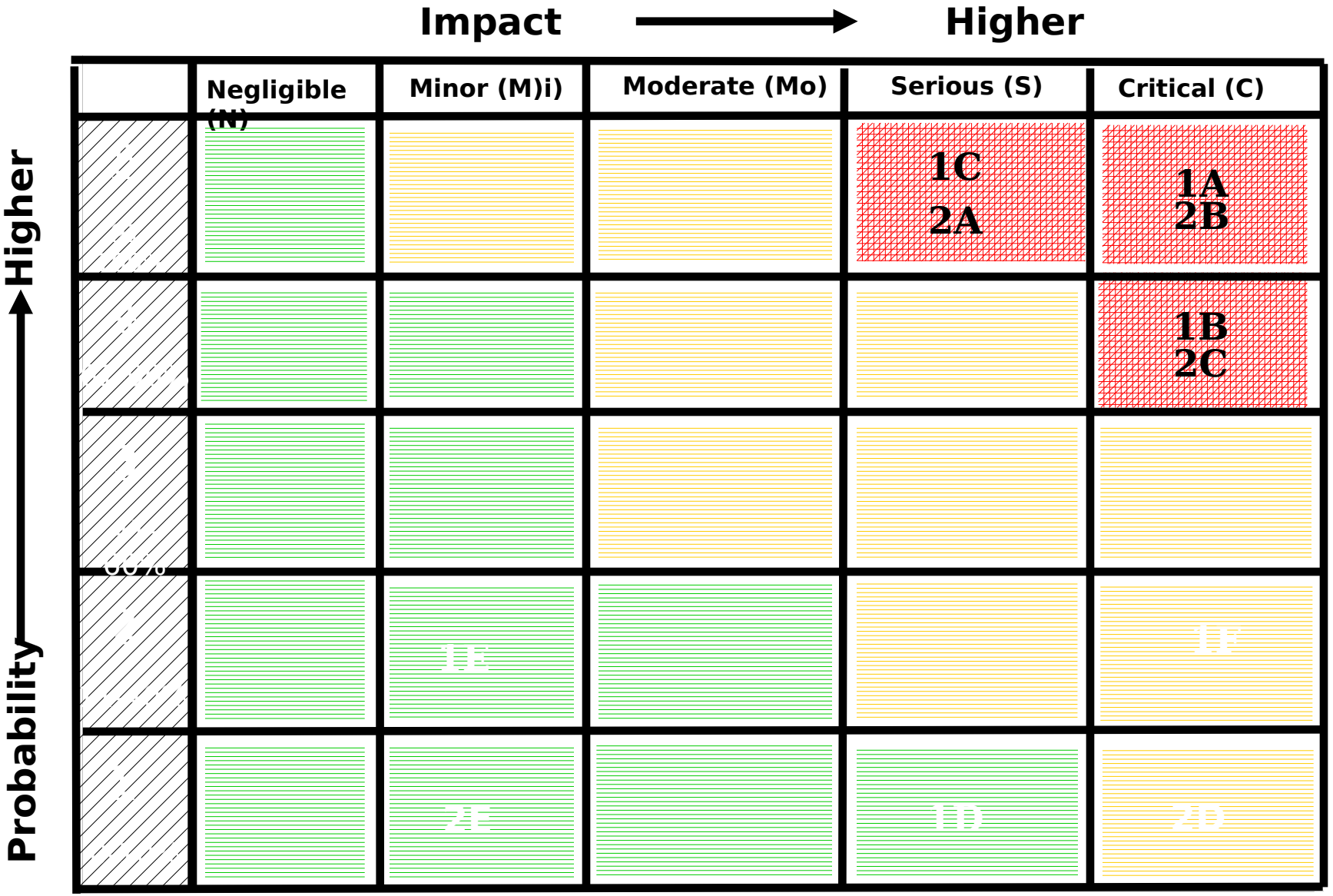


Risk Identification

Req # 2 Capability to modify 2 aircraft every 90 days for 3 years

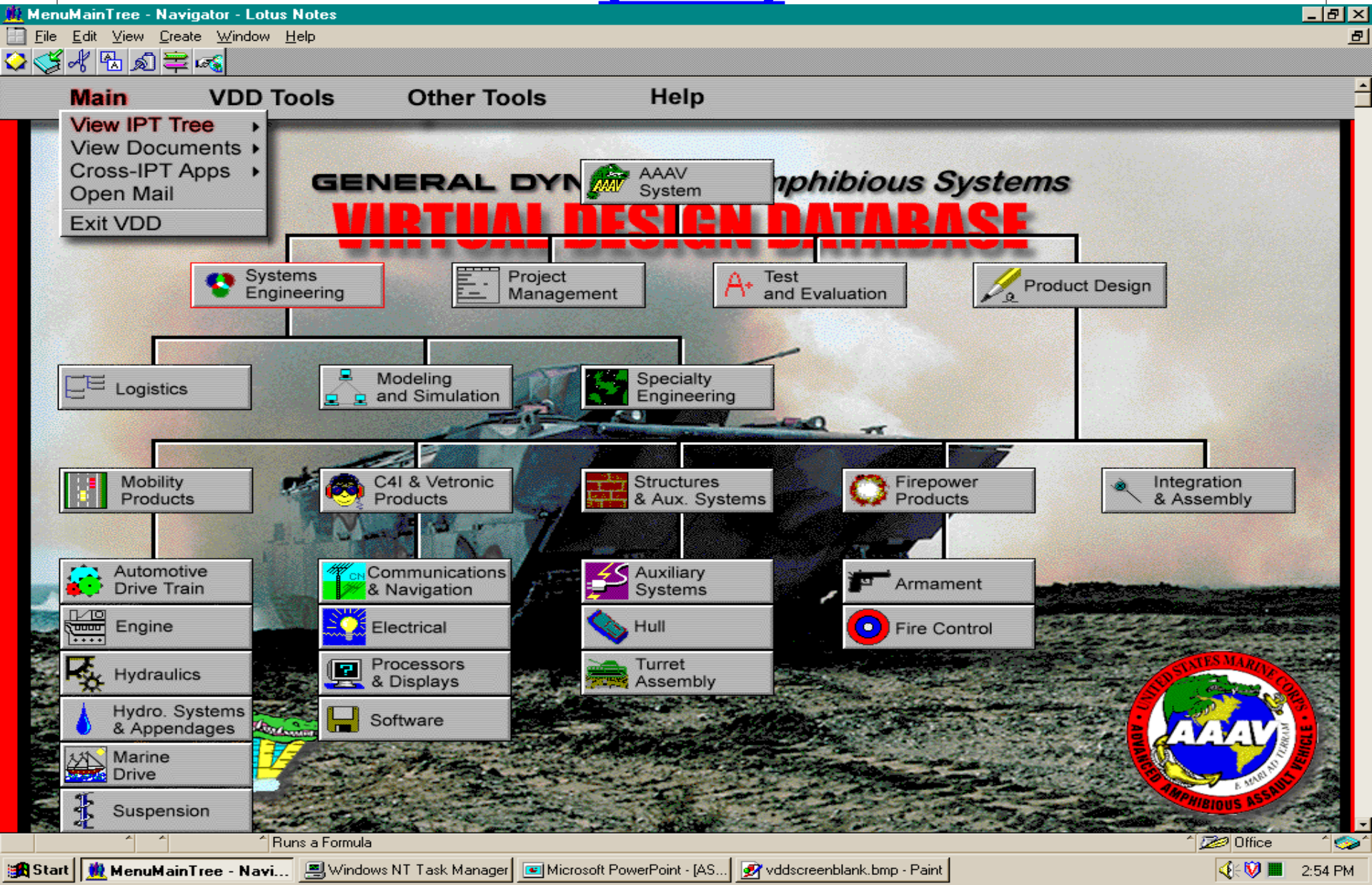
		Pr	Im
A	Manpower unavailable for multiple shifts	5	S
B	Available personnel inadequately trained	5	C
C	Schedule delay from Learning Curve	4	C
D	Government furnished equipment not available	1	C
E	No capability for Government to review daily schd	1	Mi
F			
G			
H			
I			
J			

Risk Matrix Scatter Diagram

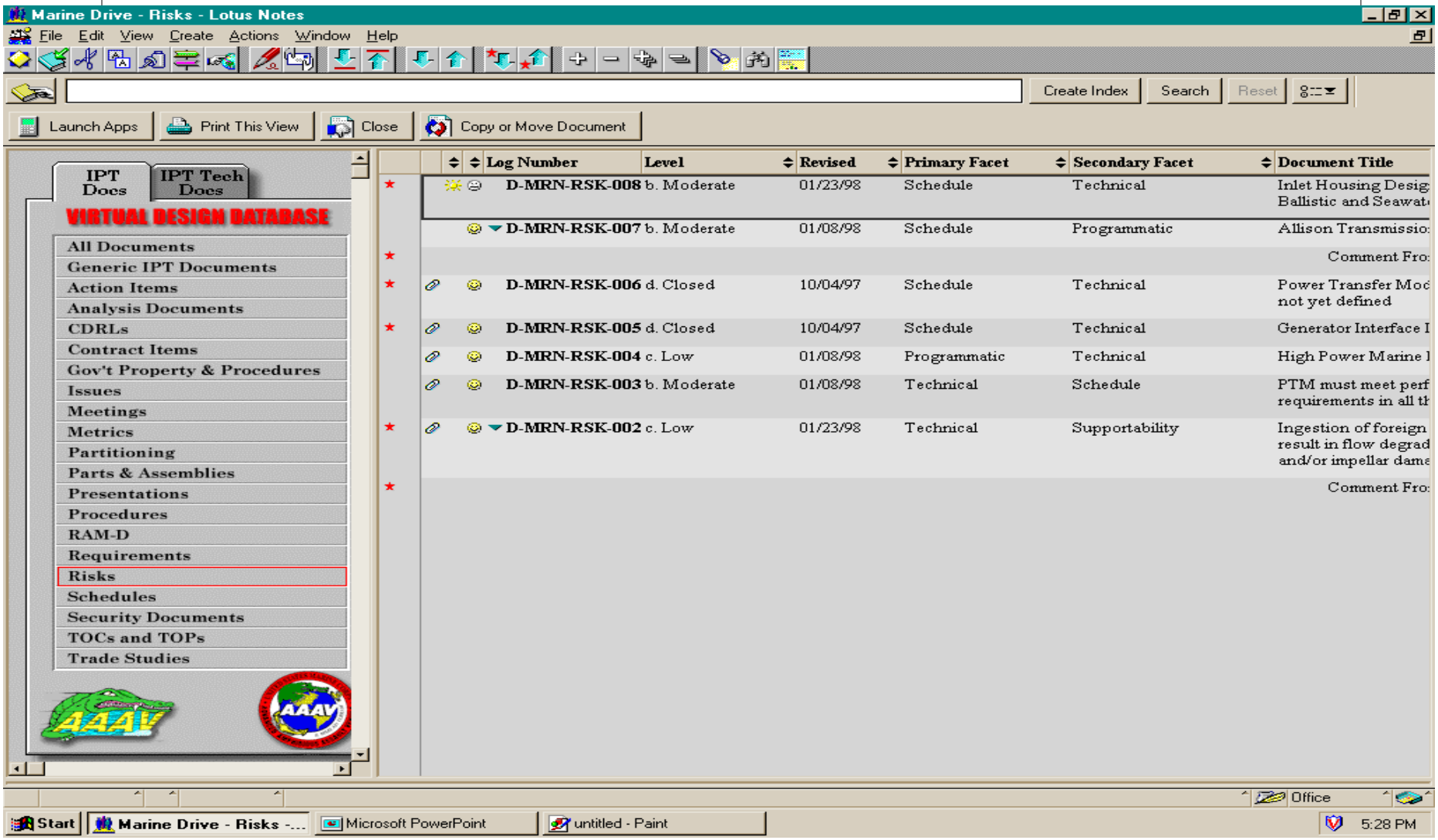


Additional Backups

Expeditionary Fighting Vehicle (EFV)



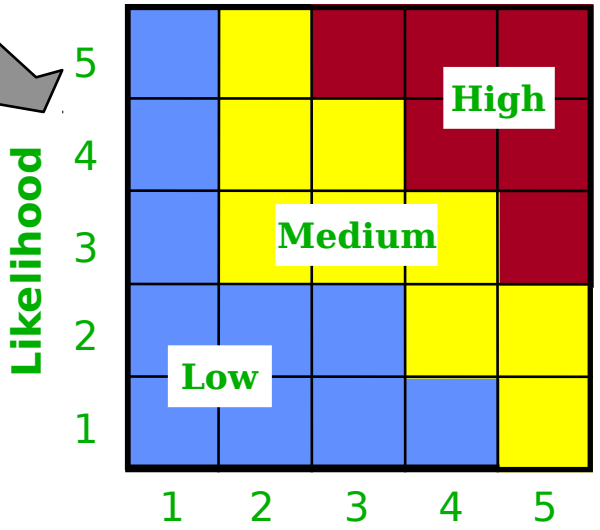
Virtual Prototype Interface
"Risk Documentation"



F/A-18 Program Risk Analysis

Likelihood

What Is the Likelihood the Risk Will Happen?		
Level		Your Approach and Processes...
1	Not Likely: ...	Will effectively avoid or mitigate this risk based on standard practices
2	Low Likelihood: ...	Have usually mitigated this type of risk with minimal oversight in similar cases
3	Likely: ...	May mitigate this risk, but workarounds will be required
4	Highly Likely: ...	Cannot mitigate this risk, but a different approach might
5	Near Certainty: ...	Cannot mitigate this type of risk; no known processes or workarounds are available



Consequence

Given that risk is realized, what would be the magnitude of the impact?			
Level	Technical	Schedule	Cost
1	Minimal or no impact	Minimal or no impact	Minimal or no impact
2	Minor perf shortfall, same approach retained	Additional activities required; able to meet key dates	Budget increase or unit production cost increase <1%
3	Mod perf shortfall, but workarounds available	Minor schedule slip; will miss need date	Budget increase or unit production cost increase <5%
4	Unacceptable, but workarounds available	Program critical path affected	Budget increase or unit production cost increase <10%
5	Unacceptable; no alternatives exist	Cannot achieve key program milestone	Budget increase or production cost increase >10%

Questions about Risk Management?
Call a member of the Risk Mgmt Team

Willie Smith	703-604-2210 x7418
John Hayn	314-234-9738
Ruben Garcia	314-233-6315
Jim Warren	314-234-8754
Ron Morris	310-332-8050
Vic Santos	617-594-5930
Pam Barber	703-413-7264

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Risk Scatter Diagram
"Rat Trap" Exercise

ssembly Test
- Assemble in 12 mins
- Run 25 ft
- Within 7 sec
- Within +/- 4 ft lane

esupply Test
- Deliver two rounds in 2 mins
- 20 ft run distance
- Within +/- 3 ft lane

ecovery Test
- Pull/push sled 5 ft
- Within +/- 2 ft lane
- Begin to move within 5 sec

perational Resupply
1. 30 second delivery time
2. 30 ft distance
3. +- 5 ft lane

perational Recovery
4. Pull 1 lb. Vehicle 5 ft.
5. +- 2 ft lane

laintainability Demo
6. Replace any subsystem less than 12 minutes.

** 90% accounts for four resupply runs

PROBABILITY

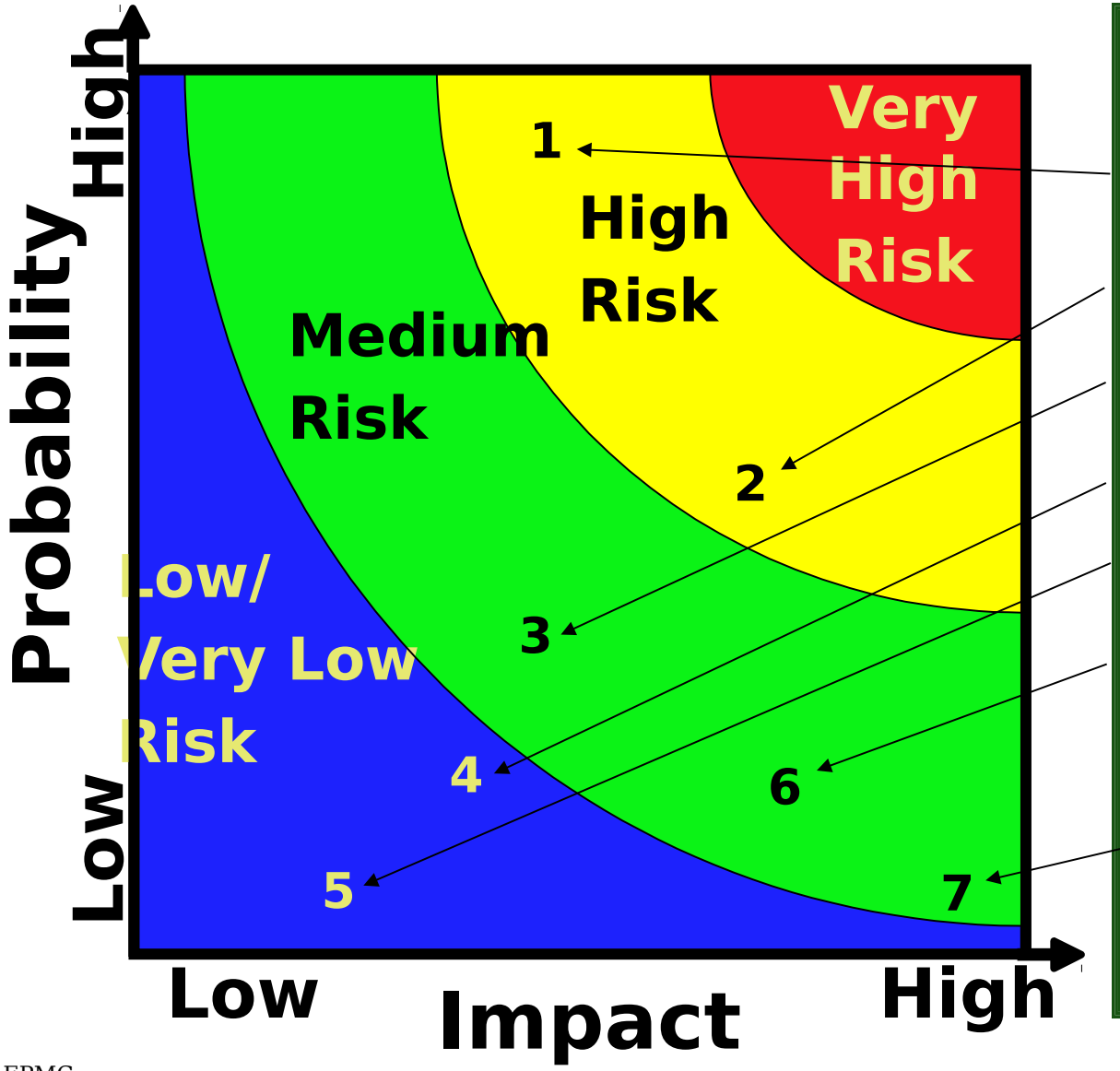
MODERATE	HIGH 4 14 15	HIGH
LOW	1 2 3 11 12 MODERATE	7 8 9 HIGH
LOW	LOW 13 16	MODERATE 5 6 10

CONSEQUENCE

Probability definitions: Event won't occur - Failure
Low: 0 -20 %
Medium: 21 - 89 %
High: 90 - 100 % **

Consequence Definitions
Low: Cost/Schedule/Performance Penalty
Medium: Failure of to Meet System Specification
High: Failure to meet recovery and/or resupply (KPP)

RISK DISPERSION PLOT

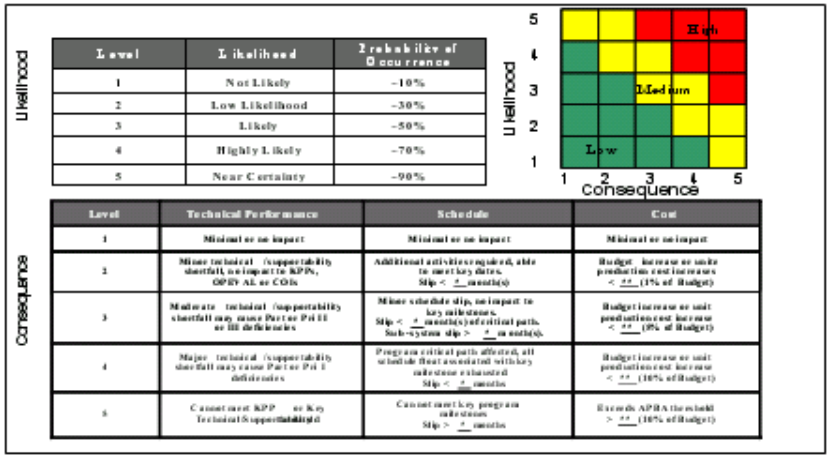


Risk

1. IOC Schedule
2. LCC
3. Reliability
4. Obsolescence
5. Funding
6. Production Quality
7. Environmental Compliance

A summary table of TRL descriptions follows:

Technology Readiness Level	Description
1. Basic principles observed and reported.	Lowest level of technology readiness. Scientific research begins to be translated into applied research and development. Examples might include paper studies of a technology's basic properties.
2. Technology concept and/or application formulated.	Invention begins. Once basic principles are observed, practical applications can be invented. Applications are speculative and there may be no proof or detailed analysis to support the assumptions. Examples are limited to analytic studies.
3. Analytical and experimental critical function and/or characteristic proof of concept.	Active research and development is initiated. This includes analytical studies and laboratory studies to physically validate analytical predictions of separate elements of the technology. Examples include components that are not yet integrated or representative.
4. Component and/or breadboard validation in laboratory environment.	Basic technological components are integrated to establish that they will work together. This is relatively "low fidelity" compared to the eventual system. Examples include integration of "ad hoc" hardware in the laboratory.
5. Component and/or breadboard validation in relevant environment.	Fidelity of breadboard technology increases significantly. The basic technological components are integrated with reasonably realistic supporting elements so it can be tested in a simulated environment. Examples include "high fidelity" laboratory integration of components.
6. System/subsystem model or prototype demonstration in a relevant environment.	Representative model or prototype system, which is well beyond that of TRL 5, is tested in a relevant environment. Represents a major step up in a technology's demonstrated readiness. Examples include testing a prototype in a high-fidelity laboratory environment or in simulated operational environment.
7. System prototype demonstration in an operational environment.	Prototype near, or at, planned operational system. Represents a major step up from TRL 6, requiring demonstration of an actual system prototype in an operational environment such as an aircraft, vehicle, or space. Examples include testing the prototype in a test bed aircraft.
8. Actual system completed and qualified through test and demonstration.	Technology has been proven to work in its final form and under expected conditions. In almost all cases, this TRL represents the end of true system development. Examples include developmental test and evaluation of the system in its intended weapon system to determine if it meets design specifications.
9. Actual system proven through successful mission operations.	Actual application of the technology in its final form and under mission conditions, such as those encountered in operational test and evaluation. Examples include using the system under

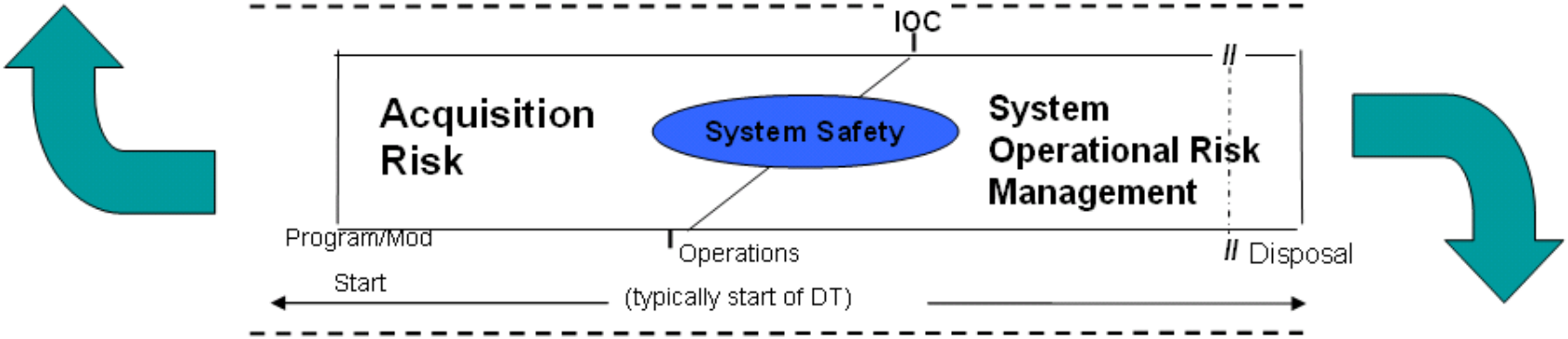


Level	Likelihood	Probability of Occurrence
1	Not Likely	~10%
2	Low Likelihood	~30%
3	Likely	~50%
4	Highly Likely	~70%
5	Near Certainty	~90%

Level	Technical Performance	Schedule	Cost
1	Minimal or no impact	Minimal or no impact	Minimal or no impact
2	Minor technical /supportability shortfall, no impact to KPPs, OPEVAL or COIs	Additional activities required, able to meet key dates. Slip < _ month(s)	Budget increase or unit production cost increases < __ (1% of Budget)
3	Moderate technical /supportability shortfall may cause Part or Pt II or III deficiencies	Minor schedule slip, no impact to key milestones. Slip < _ month(s) of critical path. Sub-system slip > _ month(s).	Budget increase or unit production cost increase < __ (8% of Budget)
4	Major technical /supportability shortfall may cause Part or Pt I deficiencies	Program critical path affected, all schedule float associated with key milestone exhausted Slip < _ months	Budget increase or unit production cost increase < __ (10% of Budget)
5	Consistent KPP or Key Technical Supportability not met	Consistent key program milestones Slip > _ months	Exceeds APBA threshold > __ (10% of Budget)

Consequence

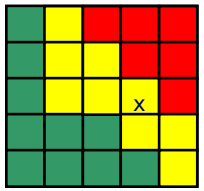
Risk Life Cycle Overview



FREQUENCY	HAZARD CATEGORIZTION	SEVERITY: CATASTROPHIC (1)	CRITICAL (2)	MARGINAL (3)	NEGLIGIBLE (4)
	FREQUENT (A) = or > 100/100K flt hrs	1	3	7	13
	PROBABLE (B) 0-99/100K flt hrs	2	5	9	16
	OCCASIONAL (C) 1.0-9.9/100K flt hrs	4	6	11	18
	REMOTE (D) 0.1-0.99/100K flt hrs	8	10	14	19
	IMPROBABLE (E) = or < 0.1/100K flt hrs	12	15	17	20

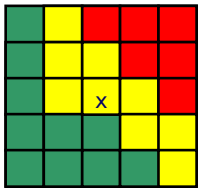
MUOS Risk Assessment

Schedule Risk #1



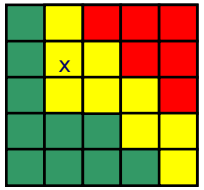
Risk: CAD Contract award delayed
Mitigation Plans:
- Source selection process
- Well defined selection criteria
- Four versions of draft RFP
- MS A scheduled for Aug 02

Schedule Risk #2



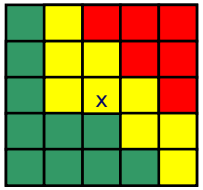
Risk: IOC of July 2008
Mitigation Plans:
- EVMS
- Contract Incentives
- Design off-ramps
- Need funding stability

Cost Risk #1



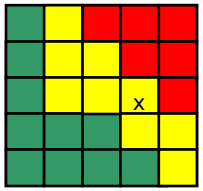
Risk: Cost estimates inaccurate
Mitigation Plans:
- Better system definition
- Fund to CAIG estimate at MS B
- Cross-check PO model
- CAD Ktr bottoms-up estimate

Cost Risk #2



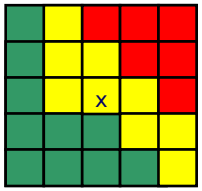
Risk: MUOS Cost Control
Mitigation Plans:
- CAIV
- EVMS
- Multi-year procurement
- Incentives in SD&D

Technical Risk #1



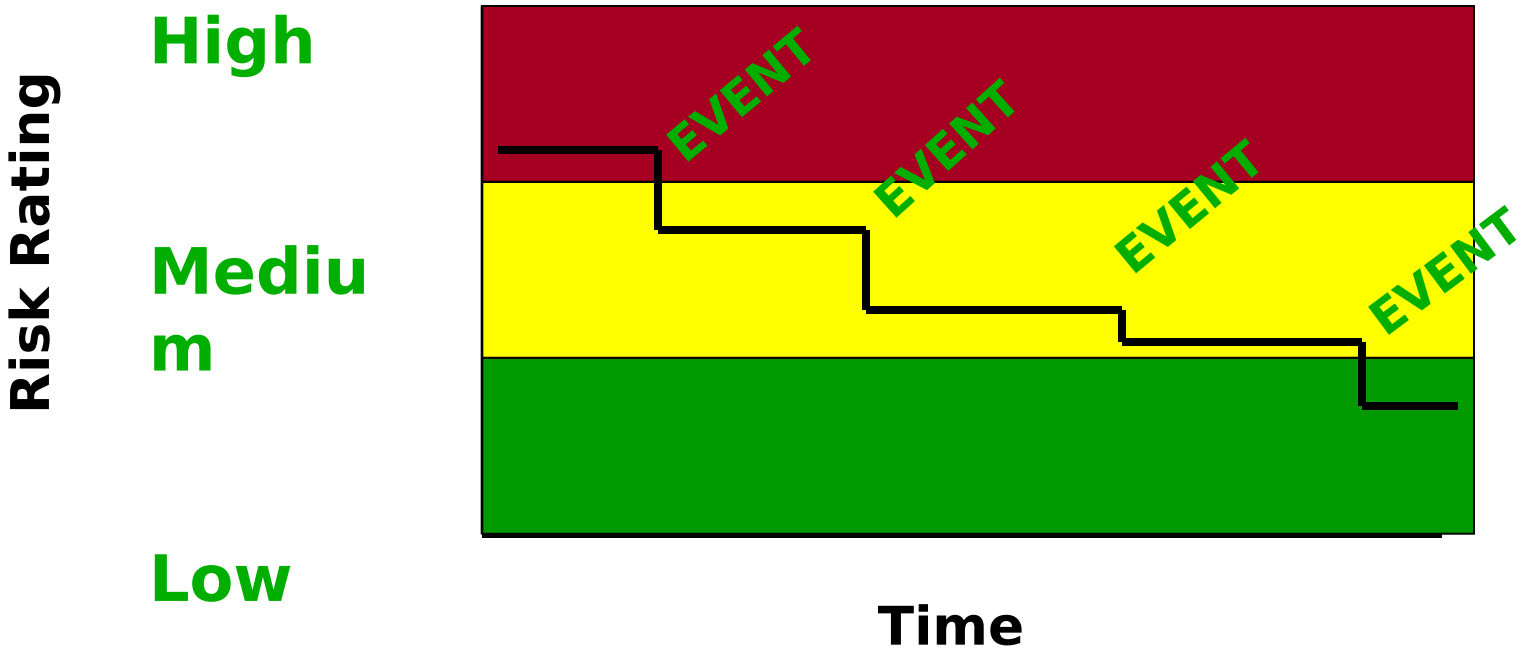
Risk: Software development
Mitigation Plans:
- Software development plan
- SEI Level III certification
- OPTEVFOR EOA
- Independent assessment

Technical Risk #2



Risk: System Integration
Mitigation Plans:
- JTRS MOA
- Modeling/simulation
- CAD demonstrations
- Interface Control IPTs

Risk Handling Plan
"Waterfall"



Five Steps for Using Risk+

I. Plan your project

In order to use Risk+ you must have a project plan prepared in MS Project '98. The plan should have a complete critical path network in to achieve meaningful risk analysis results.

II. Select tasks for detailed analysis

Risk+ will collect and generate detailed statistical information for tasks you identify in this step. Typically, only the key or high risk tasks are analyzed, rather than analyzing all the tasks in the project plan.

III. Enter risk parameters

You must enter minimum, most likely, and maximum duration and cost information for each program activity (low level task). Additionally, you must specify the relative likelihood of outcomes within each range.

IV. Run the risk analysis program

In this step, you tell Risk+ what analyses to perform, and how many possible outcomes to examine before generating its results.

V. Review risk analysis results

Risk+ generates a variety of graphical reports (histograms) which you can use to evaluate the effects of risk on your project.

"CLICK" TO CONTINUE...

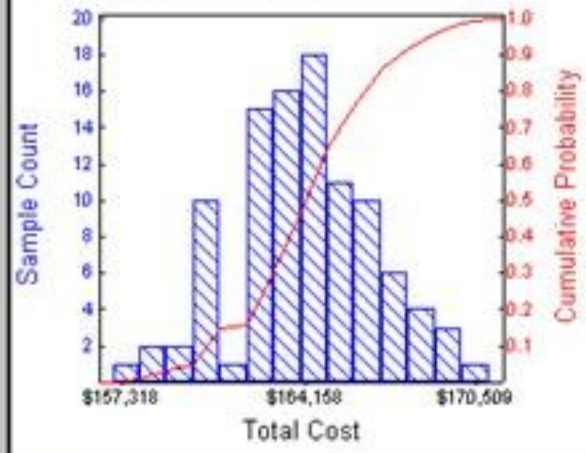
Cost Histogram

Name: Design Phase 1 Duration: 2d Fixed Previous Next

Start: Mon 2/21/94 Finish: Tue 2/22/94 Percent Complete: 0%

Date: 9/6/00 9:12:40 AM
Number of Samples: 100
Unique ID: 2
Name: Design Phase 1

Cost Std Deviation: $2,631
95% Confidence Interval: $516
Each bar represents $1,000



Cost Probability Table

Prob	Cost	Prob	Cost
0.05	$159,532	0.55	$164,350
0.10	$160,356	0.60	$164,837
0.15	$160,922	0.65	$164,963
0.20	$162,061	0.70	$165,181
0.25	$162,599	0.75	$165,721
0.30	$162,977	0.80	$166,414
0.35	$163,203	0.85	$166,756
0.40	$163,426	0.90	$167,385
0.45	$163,921	0.95	$168,752
0.50	$164,236	1.00	$170,509

The **Cost Probability Table** shows the probability that the task will be completed for a certain cost.

"CLICK" TO CONTINUE...

PEO XXX

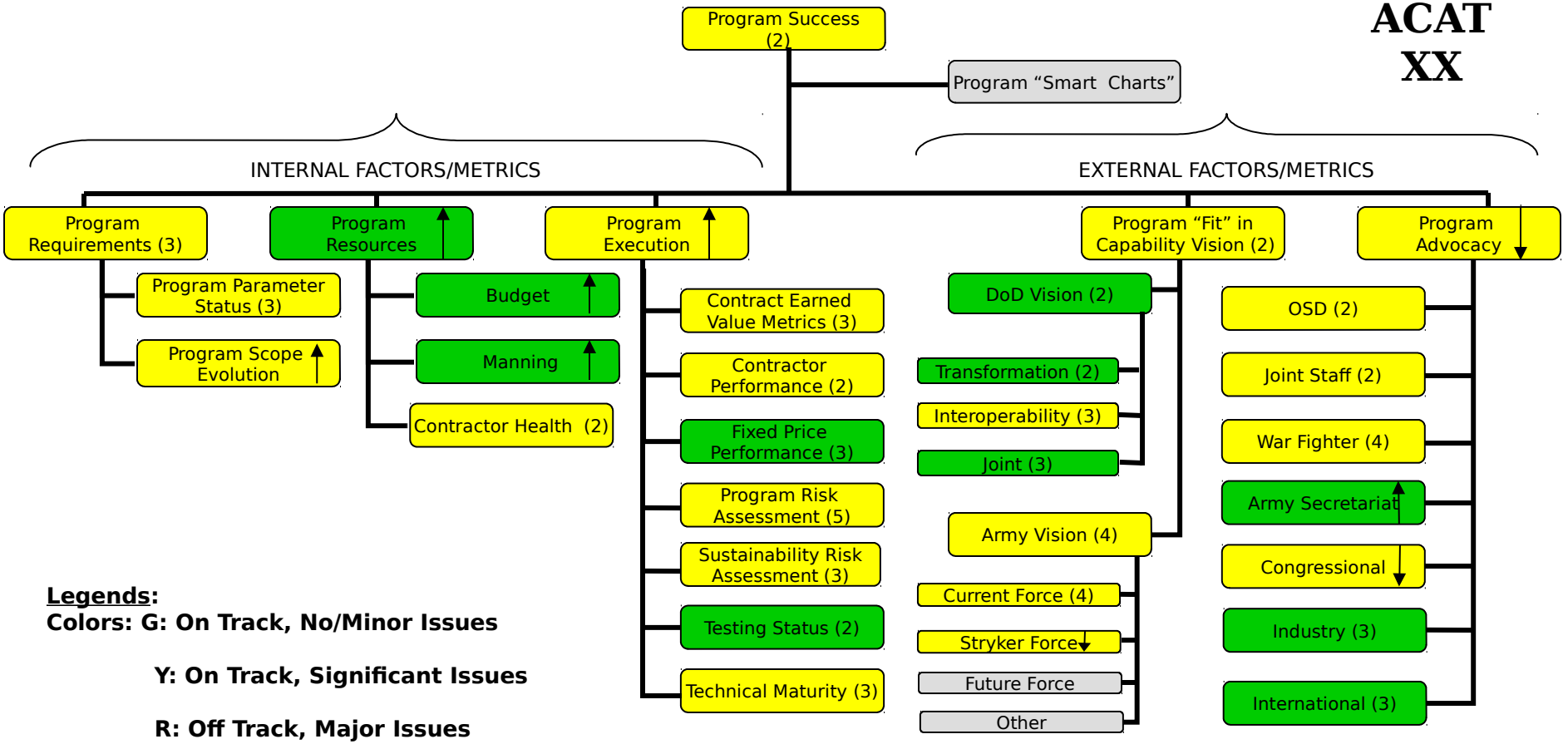
PROGRAM SUCCESS PROBABILITY SUMMARY

Program Acronym

COL, PM

Date of Review: dd mmm yy

ACAT XX



Legends:
Colors: G: On Track, No/Minor Issues

Y: On Track, Significant Issues

R: Off Track, Major Issues
Gray: Not Rated/Not Applicable
Trends: Up Arrow: Situation Improving
(number): Situation Stable
(for # Reporting Periods)
Down Arrow: Situation Deteriorating

Program Life Cycle Phase: _____